WHAT IS CLAIMED IS:

1. A hidden line processing method for avoiding projection of lines hidden by a plurality of polygons in projecting a three-dimensional model consisting of the polygons onto a two-dimensional plane, comprising the steps of:

obtaining the maximum value PZ_{max} of the Z-axis direction component of each vertex in a viewpoint coordinate system for each of the plurality of polygons belonging to parts constituting the three-dimensional model;

sorting the plurality of polygons in a descending order based on the obtained maximum values PZ_{max};

obtaining a value LZ_{min} that is the smaller of the Z-axis direction components in the viewpoint coordinate system of two (2) end points of an arbitrary line obtained from the plurality of polygons; and

comparing the maximum value PZ_{max} of the Z-axis direction component of the plurality of polygons with the value LZ_{min} that is the smaller of the above obtained Z-axis direction components of the arbitrary line, in the sorted order, wherein

at the time when $LZ_{min} \geqq PZ_{max}$, determination of whether or not the lines are hidden lines is avoided for polygons subsequent to the plurality of polygons sorted.

2. The hidden line processing method according to claim 1, wherein, for the plurality of polygons belonging to the arbitrary part, each of their normal vectors has a component in the opposite direction against the direction of the line of sight from the viewpoint of the viewpoint coordinate system.

3. A hidden line processing method for avoiding projection of lines hidden by a plurality of polygons in projecting a three-dimensional model consisting of the polygons onto a two-dimensional plane, comprising the steps of;

for a priority polygon group including a predetermined number of polygons obtained in the order of large projection area made when each of a plurality of polygons constituting a three-dimensional model is projected onto a two-dimensional plane, and for a plurality of polygon groups constituting a part to which a line undergoing determination to be a hidden line or not, in the order of the priority polygon group and the plurality of polygon groups constituting the part,

obtaining the maximum value PZ_{max} of the Z-axis direction component of each vertex in a viewpoint coordinate system for each of the plurality of polygons;

sorting the plurality of polygons in a descending order based on the obtained maximum values PZ_{max};

obtaining a value LZ_{min} that is the smaller of the Z-axis

direction components in the viewpoint coordinate system, of two (2) end points of an arbitrary line obtained from the plurality of polygons; and

comparing the maximum value PZ_{max} of the Z-axis direction component of the plurality of polygons with the value LZ_{min} that is the smaller of the above obtained Z-axis direction components of the arbitrary line, in the sorted order, wherein

at the time when $LZ_{min} \geqq PZ_{max}$, determination of whether or not the lines are hidden lines is avoided for polygons subsequent to the plurality of polygons sorted.

4. The hidden line processing method according to claim 1, wherein

the arbitrary line is a side common to polygons adjacent to each other, of which the angle formed by respective normal vectors is not equal or close to $0°$.

5. The hidden line processing method according to claim 1, further comprising the steps of;

defining an inclusive circle including vertices of the polygon when each of the plurality of polygons is projected onto a two-dimensional plane;

determining whether a portion of an arbitrary line is present in the inclusive circle corresponding to the polygon for the polygons for which determination of whether or not the line is an internal line is not avoided; and

erasing hidden line portions on the two-dimensional plane when the portion of the arbitrary line is present in the inclusive circle.

6. The hidden line processing method according to claim 3, wherein

the arbitrary line is a side common to polygons adjacent to each other, of which the angle formed by respective normal vectors is not equal or close to 0°.

7. The hidden line processing method according to claim 3, further comprising the steps of;

defining an inclusive circle including vertices of the polygon when each of the plurality of polygons is projected onto a two-dimensional plane;

determining whether a portion of an arbitrary line is present in the inclusive circle corresponding to the polygon for the polygons for which determination of whether or not the line is an internal line is not avoided; and

erasing hidden line portions on the two-dimensional plane when the portion of the arbitrary line is present in the inclusive circle.

8. A method for identifying as an internal line a ridge line or an contour line of a three-dimensional model, appearing when only the interior of the three-dimensional model is displayed in projecting the three-dimensional

model consisting of a plurality of polygons onto a two-dimensional plane, comprising the steps of:

determining the value in the Z-axis direction of a normal vector belonging to each of two polygons having a ridge line or an contour line of the three-dimensional model as a common side; and

determining the common side as an internal line if the value in the Z-axis direction of any of the normal vectors of the two polygons is determined zero (0) or less based on the determination of the direction of the normal vector.

9. The method for identifying an internal line according to claim 8, further comprising the steps of:

determining the relation of the positions of the two polygons in the Z-axis direction in the case where the directions of the values in the Z-axis direction of the normal vectors belonging respectively to the two polygons differs from each other based on the determination of the direction of the normal vectors; and

determining the common side as an internal line when the normal vector of a polygon present on the viewpoint side is negative.

10. The method for identifying an internal line according to claim 8, further comprising the step of:

determining the common side as an internal line when

the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the determination of the directions of the normal vectors, when a portion of a side of one of the two polygons is hidden by the other polygon and when the direction of the normal vector of the other polygon is negative.

11. The hidden line processing method according to claim 1, further comprising the steps of;

determining the value in the Z-axis direction of the normal vector belonging to each of the two polygons having a ridge line or an contour line of the three-dimensional model as a common side;

determining the common side as an internal line when the value in the Z-axis direction of any of the normal vectors of the two polygons is zero (0) or less based on the determination of the directions of the normal vectors; and

excluding the line determined as an internal line from the target of the arbitrary lines.

12. The hidden line processing method according to claim 3, further comprising the steps of;

determining the value in the Z-axis direction of the normal vector belonging to each of the two polygons having a ridge line or an contour line of the three-dimensional

model as a common side;

determining the common side as an internal line when the value in the Z-axis direction of any of the normal vectors of the two polygons is zero (0) or less based on the determination of the directions of the normal vectors; and

excluding the line determined as an internal line from the target of the arbitrary lines.

13. The hidden line processing method according to claim 11, wherein

the normal vectors of the plurality of polygons belonging to the arbitrary part have components in the opposite direction against the direction of the line of sight from the viewpoint in the viewpoint coordinate system.

14. The hidden line processing method according to claim 12, wherein

the normal vectors of the plurality of polygons belonging to the arbitrary part have components in the opposite direction against the direction of the line of sight from the viewpoint in the viewpoint coordinate system.

15. The method for determining an internal line according to claim 11, further comprising the step of:

determining the common side as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the determination of the directions of the normal vectors, when a vertex of a polygon of the two polygons is in the other polygon, when the value in the Z-axis direction of a vertex of a polygon is larger than the value in the Z-axis direction of a vertex of the other polygon and when the direction of the normal vector of the polygon is negative.

16. The method for determining an internal line according to claim 12, further comprising the step of:

determining the common side as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the determination of the directions of the normal vectors, when a vertex of a polygon of the two polygons is in the other polygon, when the value in the Z-axis direction of a vertex of a polygon is larger than the value in the Z-axis direction of a vertex of the other polygon and when the direction of the normal vector of the polygon is negative.

17. The method for determining an internal line according to claim 11, further comprising the step of:

determining the common side as an internal line when

the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the determination of the directions of the normal vectors, when a portion of a side of one of the two polygons is hidden by the other polygon and when the direction of the normal vector of the other polygon is negative.

18. The method for determining an internal line according to claim 12, further comprising the step of:

determining the common side as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the determination of the directions of the normal vectors, when a portion of a side of one of the two polygons is hidden by the other polygon and when the direction of the normal vector of the other polygon is negative.

19. A method for projecting a sectional view of a three-dimensional model consisting of a plurality of polygons onto a two-dimensional plane in a state that the model is stuffed, comprising the steps of:

determining the value in the Z-axis direction of the normal vector belonging to each of two polygons having a ridge line or an contour line of a three-dimensional model as a common side; and

determining the common side as an internal line when the value in the Z-axis direction of any of the normal vectors of the two polygons is zero (0) or less based on the determination of the directions of the normal vectors, wherein

the sectional view of the three-dimensional model is displayed such that the sectional view is displayed in a state that it is stuffed, by excluding the line determined as an internal line from the target to be displayed in a line image projected on the two-dimensional plane.

20. The method for projecting according to claim 19, further wherein

an internal line to be excluded from the target of display in a line image projected onto the two-dimensional plane is the common side determined as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the determination of the directions of the normal vectors, when a vertex of a polygon of the two polygons is in the other polygon, when the value in the Z-axis direction of a vertex of a polygon is larger than the value in the Z-axis direction of a vertex of the other polygon and when the direction of the normal vector of the polygon is negative.

21. The method for projecting according to claim 19,

wherein

an internal line to be excluded from the target of display in a line image projected onto the two-dimensional plane is the common side determined as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the determination of the directions of the normal vectors, when a portion of a side of one of the two polygons is hidden by the other polygon and when the direction of the normal vector of the other polygon is negative.

22. An information processing apparatus for creating a two-dimensional image by projecting a three-dimensional model consisting of a plurality of polygons onto a two-dimensional plane, comprising:

a memory storing a program for processing of avoiding projecting of lines hidden by the polygons, and program data;

program executing and controlling unit executing reading out of the program stored in the memory: and

a display apparatus for outputting and displaying a two-dimensional image created by the program executed and controlled by the program executing and controlling means, wherein

the program executing and controlling means, according to the program and based on the program data

stored in the memory, obtains the maximum value PZ_{max} of the Z-axis direction component of each vertex in a viewpoint coordinate system for each of the plurality of polygons belonging to parts constituting the three-dimensional model;

sorts the plurality of polygons in a descending order based on the obtained maximum values PZ_{max};

obtains a value LZ_{min} that is the smaller of the Z-axis direction components in the viewpoint coordinate system of two (2) end points of an arbitrary line obtained from the plurality of polygons;

compares the maximum value PZ_{max} of the Z-axis direction component of the plurality of polygons with the value LZ_{min} that is the smaller of the above obtained Z-axis direction components of the arbitrary line, in the sorted order; and

at the time when $LZ_{min} \geqq PZ_{max}$, executes a process for avoiding determination of whether or not the lines are hidden lines for polygons subsequent to the plurality of polygons sorted.

23. The information processing apparatus according to claim 22, wherein, for the plurality of polygons belonging to the arbitrary part, each of their normal vectors has a component in the opposite direction against the direction of the line of sight from the viewpoint of the viewpoint coordinate system.

24. An information processing apparatus for creating a two-dimensional image by projecting a three-dimensional model consisting of a plurality of polygons onto a two-dimensional plane, comprising:

a memory storing a program for processing of avoiding projecting of lines hidden by the polygons, and program data;

program executing and controlling unit executing reading out of the program stored in the memory: and

a display apparatus for outputting and displaying a two-dimensional image created by the program executed and controlled by the program executing and controlling means, wherein

the program executing and controlling means, according to the program and based on the program data stored in the memory,

for a priority polygon group including a predetermined number of polygons obtained in the order of large projection area made when each of a plurality of polygons constituting a three-dimensional model is projected onto a two-dimensional plane, and for a plurality of polygon groups constituting a part to which a line undergoing determination to be a hidden line or not; and

in the order of the priority polygon group and the plurality of polygon groups constituting the part,

obtains the maximum value PZ_{max} of the Z-axis direction

component of each vertex in a viewpoint coordinate system for each of the polygons;

sorts the plurality of polygons in a descending order based on the obtained maximum values PZ_{max};

obtains a value LZ_{min} that is the smaller of the Z-axis direction components in the viewpoint coordinate system, of two (2) end points of an arbitrary line obtained from the plurality of polygons;

comparing the maximum value PZ_{max} of the Z-axis direction component of the plurality of polygons with the value LZ_{min} that is the smaller of the above obtained Z-axis direction components of the arbitrary line, in the sorted order, and

at the time when $LZ_{min} \geqq PZ_{max}$, executes a process for avoiding determination of whether or not the lines are hidden lines for polygons subsequent to the plurality of polygons sorted.

25. The information processing apparatus according to claim 22, wherein

the arbitrary line is a side common to polygons adjacent to each other, of which the angle formed by respective normal vectors is not equal or close to 0° .

26. The information processing apparatus according to claim 22, wherein the program executing and controlling means, according to the program, further;

defines an inclusive circle including vertices of the polygon when each of the plurality of polygons is projected onto a two-dimensional plane;

determines whether a portion of an arbitrary line is present in the inclusive circle corresponding to the polygon for the polygons for which determination of whether or not the line is an internal line is not avoided; and

erases hidden line portions of a line on the two-dimensional plane when the portion of the arbitrary line is present in the inclusive circle.

27. The information processing apparatus according to claim 24, wherein

the arbitrary line is a side common to polygons adjacent to each other, of which the angle formed by respective normal vectors is not equal or close to 0°.

28. The information processing apparatus according to claim 24, wherein the program executing and controlling means, according to the program, further;

defines an inclusive circle including vertices of the polygon when each of the plurality of polygons is projected onto a two-dimensional plane;

determines whether a portion of an arbitrary line is present in the inclusive circle corresponding to the polygon for the polygons for which determination of whether or not the line is an internal line is not avoided; and

erases hidden line portions of a line on the two-dimensional plane when the portion of the arbitrary line is present in the inclusive circle.

29. An information processing apparatus for creating a two-dimensional image by projecting a three-dimensional model consisting of a plurality of polygons onto a two-dimensional plane, comprising:

a memory storing a program for processing of avoiding projecting of lines hidden by the polygons, and program data;

program executing and controlling means for executing reading out of the program stored in the memory: and

a display apparatus for outputting and displaying a two-dimensional image created by the program executed and controlled by the program executing and controlling means, wherein

the program executing and controlling means, in order to identify a ridge line or an contour line of the three-dimensional model appearing when only the interior of the three-dimensional model is displayed, as an internal line in projecting the three-dimensional model consisting of the plurality of polygons onto the two-dimensional plane, according to the program and based on the program data stored in the memory,

determines the value in the Z-axis direction of a normal vector belonging to each of two polygons having a ridge

line or an contour line of the three-dimensional model as a common side; and

determines the common side as an internal line if the value in the Z-axis direction of any of the normal vectors of the two polygons is zero (0) or less based on the determination of the direction of the normal vector.

30. The information processing apparatus according to claim 29, wherein the program executing and controlling means, in compliance with the program, further:

determines the relation of the positions of the two polygons in the Z-axis direction in the case where the senses of the values in the Z-axis direction of the normal vectors belonging respectively to the two polygons differs from each other based on the determination of the direction of the normal vectors; and

determines the common side as an internal line when the normal vector of a polygon present on the viewpoint side is negative.

31. The information processing apparatus according to claim 30, wherein the program executing and controlling means further:

determines the common side as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the

determination of the directions of the normal vectors, when a portion of a side of one of the two polygons is hidden by the other polygon and when the direction of the normal vector of the other polygon is negative.

32. The information processing apparatus according to claim 22, wherein the program executing and controlling means further:

determines the value in the Z-axis direction of the normal vector belonging to each of the two polygons having a ridge line or an contour line of the three-dimensional model as a common side;

determines the common side as an internal line when the value in the Z-axis direction of any of the normal vectors of the two polygons is zero (0) or less based on the determination of the directions of the normal vectors; and

excludes the line determined as an internal line from the target of the arbitrary lines.

33. The information processing apparatus according to claim 24, wherein the program executing and controlling means further:

determines the value in the Z-axis direction of the normal vector belonging to each of the two polygons having a ridge line or an contour line of the three-dimensional model as a common side;

determines the common side as an internal line when the value in the Z-axis direction of any of the normal vectors of the two polygons is zero (0) or less based on the determination of the directions of the normal vectors; and

excludes the line determined as an internal line from the target of the arbitrary lines.

34. The information processing apparatus according to claim 32, wherein

the normal vectors of the plurality of polygons belonging to the arbitrary part have components in the opposite direction against the direction of the line of sight from the viewpoint in the viewpoint coordinate system.

35. The information processing apparatus according to claim 32, wherein the program executing and controlling means, according to the program, further:

determines the common side as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the determination of the directions of the normal vectors, when a vertex of a polygon of the two polygons is in the other polygon, when the value in the Z-axis direction of a vertex of a polygon is larger than the value in the Z-axis

direction of a vertex of the other polygon and when the direction of the normal vector of the polygon is negative.

36. The information processing apparatus according to claim 32, wherein the program executing and controlling means further:

determines the common side as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the determination of the directions of the normal vectors, when a portion of a side of one of the two polygons is hidden by the other polygon and when the direction of the normal vector of the other polygon is negative.

37. An information processing apparatus for creating a two-dimensional image by projecting a three-dimensional model consisting of a plurality of polygons onto a two-dimensional plane, comprising:

a memory storing a program for processing of avoiding projecting of lines hidden by the polygons, and program data;

program executing and controlling means for executing reading out of the program stored in the memory: and

a display apparatus for outputting and displaying a two-dimensional image created by the program executed and controlled by the program executing and controlling means,

wherein

the program executing and controlling means, according to the program and based on the program data, determines the value in the Z-axis direction of the normal vector belonging to each of two polygons having a ridge line or an contour line of a three-dimensional model as a common side;

determines the common side as an internal line when the value in the Z-axis direction of any of the normal vectors of the two polygons is zero (0) or less based on the determination of the directions of the normal vectors; and

is arranged to display the sectional view of the three-dimensional model such that the sectional view is displayed in a state that it is stuffed, by excluding the line determined as an internal line from the target to be displayed in a line image projected on the two-dimensional plane.

38. The information processing apparatus according to claim 37, wherein

an internal line to be excluded from the target of display in a line image projected onto the two-dimensional plane is the common side determined as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the

determination of the directions of the normal vectors, when a vertex of a polygon of the two polygons is in the other polygon, when the value in the Z-axis direction of a vertex of a polygon is larger than the value in the Z-axis direction of a vertex of the other polygon and when the direction of the normal vector of the polygon is negative.

39. The information processing apparatus according to claim 38, wherein

an internal line to be excluded from the target of display in a line image projected onto the two-dimensional plane is the common side determined as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the determination of the directions of the normal vectors, when a portion of a side of one of the two polygons is hidden by the other polygon and when the direction of the normal vector of the other polygon is negative.

40. A program executed and controlled in an information processing apparatus for creating a two-dimensional image by projecting a three-dimensional model consisting of a plurality of polygons onto a two-dimensional plane, the program being operable to execute a process for avoiding projecting of lines hidden by the polygons, the program comprising the steps of causing program executing and

controlling means to, based on program data stored in a memory:

obtain the maximum value PZ_{max} of the Z-axis direction component of each vertex in a viewpoint coordinate system for each of the plurality of polygons belonging to parts constituting the three-dimensional model;

sort the plurality of polygons in a descending order based on the obtained maximum values PZ_{max};

obtain a value LZ_{min} that is the smaller of the Z-axis direction components in the viewpoint coordinate system of two (2) end points of an arbitrary line obtained from the plurality of polygons;

compare the maximum value PZ_{max} of the Z-axis direction component of the plurality of polygons with the value LZ_{min} that is the smaller of the above obtained Z-axis direction components of the arbitrary line, in the sorted order; and

at the time when $LZ_{min} \geqq PZ_{max}$, execute a process for avoiding determination of whether or not the lines are hidden lines for polygons subsequent to the plurality of polygons sorted.

41. The program according to claim 40, wherein, for the plurality of polygons belonging to the arbitrary part, each of their normal vectors has a component in the opposite direction against the direction of the line of sight from the viewpoint of the viewpoint coordinate system.

42. A program executed and controlled in an information processing apparatus for creating a two-dimensional image by projecting a three-dimensional model consisting of a plurality of polygons onto a two-dimensional plane, the program being operable to execute a process for avoiding projecting of lines hidden by the polygons, the program comprising the steps of causing program executing and controlling means to, based on program data read out from a memory:

for a priority polygon group including a predetermined number of polygons obtained in the order of large projection area made when each of a plurality of polygons constituting a three-dimensional model is projected onto a two-dimensional plane, and for a plurality of polygon groups constituting a part to which a line undergoing determination to be a hidden line or not; and

in the order of the priority polygon group and the plurality of polygon groups constituting the part,

obtain the maximum value PZ_{max} of the Z-axis direction component of each vertex in a viewpoint coordinate system for each of the polygons;

sort the plurality of polygons in a descending order based on the obtained maximum values PZ_{max};

obtain a value LZ_{min} that is the smaller of the Z-axis direction components in the viewpoint coordinate system, of two (2) end points of an arbitrary line obtained from

the plurality of polygons;

compare the maximum value PZ_{max} of the Z-axis direction component of the plurality of polygons with the value LZ_{min} that is the smaller of the above obtained Z-axis direction components of the arbitrary line, in the sorted order, and

at the time when $LZ_{min} \geqq PZ_{max}$, execute a process for avoiding determination of whether or not the lines are hidden lines for polygons subsequent to the plurality of polygons sorted.

43. The program according to claim 40, wherein

the arbitrary line is a side common to polygons adjacent to each other, of which the angle formed by respective normal vectors is not equal or close to 0° .

44. The program according to claim 42, wherein

the arbitrary line is a side common to polygons adjacent to each other, of which the angle formed by respective normal vectors is not equal or close to 0°.

45. The program according to claim 40, wherein the program further causes the program executing and controlling apparatus to:

define an inclusive circle including vertices of the polygon when each of the plurality of polygons is projected onto a two-dimensional plane;

determine whether a portion of an arbitrary line is present in the inclusive circle corresponding to the polygon for the polygons for which determination of whether or not the line is an internal line is not avoided; and

erase hidden line portions of a line on the two-dimensional plane when the portion of the arbitrary line is present in the inclusive circle.

46. The program according to claim 42, wherein the program further causes the program executing and controlling apparatus to:

define an inclusive circle including vertices of the polygon when each of the plurality of polygons is projected onto a two-dimensional plane;

determine whether a portion of an arbitrary line is present in the inclusive circle corresponding to the polygon for the polygons for which determination of whether or not the line is an internal line is not avoided; and

erase hidden line portions of a line on the two-dimensional plane when the portion of the arbitrary line is present in the inclusive circle.

47. A program executed and controlled in an information processing apparatus for creating a two-dimensional image by projecting a three-dimensional model consisting of a plurality of polygons onto a two-dimensional plane, the program being operable to execute a process for avoiding

projecting of lines hidden by the polygons, the program comprising the steps of causing program executing and controlling means to, based on program data read our from a memory:

in order to identify a ridge line or an contour line of the three-dimensional model appearing when only the interior of the three-dimensional model is displayed, as an internal line in projecting the three-dimensional model consisting of the plurality of polygons onto the two-dimensional plane,

determine the value in the Z-axis direction of a normal vector belonging to each of two polygons having a ridge line or an contour line of the three-dimensional model as a common side; and

determine the common side as an internal line if the value in the Z-axis direction of any of the normal vectors of the two polygons is zero (0) or less based on the determination of the direction of the normal vector.

48. The program according to claim 47, wherein the program further causes the program executing and controlling means to:

determine the relation of the positions of the two polygons in the Z-axis direction in the case where the senses of the values in the Z-axis direction of the normal vectors belonging respectively to the two polygons differs from each other based on the determination of the direction

of the normal vectors; and

determine the common side as an internal line when the normal vector of a polygon present on the viewpoint side is negative.

49. The program according to claim 48, wherein the program further causes the program executing and controlling means to:

determine the common side as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the determination of the directions of the normal vectors, when a portion of a side of one of the two polygons is hidden by the other polygon and when the direction of the normal vector of the other polygon is negative.

50. The program according to claim 40, wherein the program further causes the program executing and controlling means to:

determine the value in the Z-axis direction of the normal vector belonging to each of the two polygons having a ridge line or an contour line of the three-dimensional model as a common side;

determine the common side as an internal line when the value in the Z-axis direction of any of the normal vectors of the two polygons is zero (0) or less based on

the determination of the directions of the normal vectors; and

exclude the line determined as an internal line from the target of the arbitrary lines.

51. The program according to claim 42, wherein the program further causes the program executing and controlling means to:

determine the value in the Z-axis direction of the normal vector belonging to each of the two polygons having a ridge line or an contour line of the three-dimensional model as a common side;

determine the common side as an internal line when the value in the Z-axis direction of any of the normal vectors of the two polygons is zero (0) or less based on the determination of the directions of the normal vectors; and

exclude the line determined as an internal line from the target of the arbitrary lines.

52. The program according to claim 50, wherein

the normal vectors of the plurality of polygons belonging to the arbitrary part have components in the opposite direction against the direction of the line of sight from the viewpoint in the viewpoint coordinate system.

53. The program according to claim 51, wherein

the normal vectors of the plurality of polygons belonging to the arbitrary part have components in the opposite direction against the direction of the line of sight from the viewpoint in the viewpoint coordinate system.

54. The program according to claim 50, wherein the program further causes the program executing and controlling means to:

determine the common side as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the determination of the directions of the normal vectors, when a vertex of a polygon of the two polygons is in the other polygon, when the value in the Z-axis direction of a vertex of a polygon is larger than the value in the Z-axis direction of a vertex of the other polygon and when the direction of the normal vector of the polygon is negative.

55. The program according to claim 51, wherein the program further causes the program executing and controlling means to:

determine the common side as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the

determination of the directions of the normal vectors, when a vertex of a polygon of the two polygons is in the other polygon, when the value in the Z-axis direction of a vertex of a polygon is larger than the value in the Z-axis direction of a vertex of the other polygon and when the direction of the normal vector of the polygon is negative.

56. The program according to claim 50, wherein the program further causes the program executing and controlling means to:

determine the common side as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the determination of the directions of the normal vectors, when a portion of a side of one of the two polygons is hidden by the other polygon and when the direction of the normal vector of the other polygon is negative.

57. The program according to claim 51, wherein the program further causes the program executing and controlling means to:

determine the common side as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the determination of the directions of the normal vectors,

when a portion of a side of one of the two polygons is hidden by the other polygon and when the direction of the normal vector of the other polygon is negative.

58. A program executed and controlled in an information processing apparatus for creating a two-dimensional image by projecting a three-dimensional model consisting of a plurality of polygons onto a two-dimensional plane, and for executing a process for avoiding projecting of lines hidden by the polygons, comprising the steps of causing program executing and controlling means to, based on program data read out from a memory:

determine the value in the Z-axis direction of the normal vector belonging to each of two polygons having a ridge line or an contour line of a three-dimensional model as a common side;

determine the common side as an internal line when the value in the Z-axis direction of any of the normal vectors of the two polygons is zero (0) or less based on the determination of the directions of the normal vectors; and

display the sectional view of the three-dimensional model such that the sectional view is displayed in a state that it is stuffed, by excluding the line determined as an internal line from the target to be displayed in a line image projected on the two-dimensional plane.

59. The program according to claim 58, wherein

an internal line to be excluded from the target of display in a line image projected onto the two-dimensional plane is the common side determined as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the determination of the directions of the normal vectors, when a vertex of a polygon of the two polygons is in the other polygon, when the value in the Z-axis direction of a vertex of a polygon is larger than the value in the Z-axis direction of a vertex of the other polygon and when the direction of the normal vector of the polygon is negative.

60. The program according to claim 59, wherein

an internal line to be excluded from the target of display in a line image projected onto the two-dimensional plane is the common side determined as an internal line when the senses of the values in the Z-axis direction of the normal vectors respectively belonging to each of the two polygons are different from each other based on the determination of the directions of the normal vectors, when a portion of a side of one of the two polygons is hidden by the other polygon and when the direction of the normal vector of the other polygon is negative.